URGENT

TM 55-1520-238-CL
C 3

CHANGE NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 17 November 1988

Operator's Checklist
for
Army AH-64A HELICOPTER

TM 55-1520-238-CL, 18 May 1987 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
E-7/E-8	E-7/E-8

2. Retain this sheet in front of manual for reference purposes.

URGENT

READEX FICHE best copy available

TM 55-1520-238-CL
C 3

By Order of the Secretary of the Army:

CARL E. VUONO,
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, -10 & CL Maintenance requirements for AH-64A Helicopter, Attack (APACHE).

URGENT

TM 55-1520-238-CL
C 2

CHANGE NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 15 APRIL 1988

Operator's Checklist
for
ARMY AH-64A HELICOPTER

TM 55-1520-238-CL, 18 May 1987 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
N-7 and N-8	N-7 and N-8

2. Retain these sheets in front of manual for reference purposes.

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TM 55-1520-238-CL
C 2

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URGENT

TM 55-1520-238-CL
C 1

CHANGE NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 October 1987

Operator's Checklist
for
ARMY AH-64A HELICOPTER

TM 55-1520-238-CL, 18 May 1987 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
E-1 through E-3/E-4	E-1 through E-3/E-4
E-15 through E-18	E-15 through E-18

2. Retain these sheets in front of manual for reference purposes.

URGENT

TM 55-1520-238-CL
C 1

By Order of the Secretary of the Army:

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General, United States Army
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GENERAL INFORMATION AND SCOPE.

SCOPE. This checklist contains the operator's checks to be accomplished during normal and emergency operation.

General Information. The checklist consists of three parts: normal procedures, emergency procedures, and performance data. A thru-flight checklist is provided in this section and consists of asterisk "Thru Flight" items. In addition to thru flight, this checklist may be used for combat/tactical operations when authorized by the commander.

NOTE

This checklist does not replace the amplified version of the procedures in the operator's manual (TM 55-1520-238-10), but is a condensed version of each procedure.

Normal Procedures Pages. The contents of the normal procedures of this manual are a condensation of the amplified checklist appearing in the normal procedures or crew duties portion of the applicable operator's manual.

Emergency Procedures Pages. The requirements for this section of the condensed checklist manual (CL) are identical to those for the normal procedures, except that the information is drawn from the amplified checks in the emergency procedures portion of the operator's manual. The emergency requirements are subdivided into 10 classifications as follows: engine; propeller/rotor (PROP or ROTOR); fire; fuel; electrical (ELECT); hydraulic (HYD); landing and ditching (LDG/DTCH); flight controls (FLT CONT), bail out or ejection (BAILOUT) (EJECT), if applicable; and mission equipment (MSN/EQPT), as applicable. The underlined items are the steps that must be performed immediately without reference to the checklist.

Performance Data Pages. This section consists of charts, tables, and checklists for use during preflight, takeoff, cruise, landing, and shutdown.

Symbols Preceding Numbered Steps.

N – Means performance of step is mandatory for "Night Flights."

★ – Indicates a detailed procedure for this step is included in the performance checks section, located at the back of the checklist.

I – Indicates mandatory check for "Instrument Flights."

O – Indicates if installed.

(3) Indicates duties which are the responsibility of the copilot.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS.

You can help improve this manual: if you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter on DA Form 2028 (Recommended Changes to Publications and Blank Forms) through your commander to Commander, US Army Aviation Systems Command, ATTN: AMSAV-MPSD, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798.

NORMAL PROCEDURES

BEFORE EXTERIOR CHECK.

*1. Helicopter covers, locking devices, tiedowns and grounding cables – removed and stowed, pylon safety pins installed.
2. Cockpit safety – General.
3. Armament subsystems – Safe.
4. Cockpit General – Check.
5. Publications – Check.
6. Fuel sample – Check first flight of the day.

EXTERIOR CHECK.

RIGHT SIDE – UNDER SIDE FUSELAGE (AREA 1).

1. M-230E1, 30mm gun and turret – Check.
2. Searchlight – Check.

RIGHT SIDE – LOWER CENTER FUSELAGE(AREA 2).

1. Radar warning antenna – Check.
2. Forward avionics bay – Check.
3. Static port – Unobstructed.
4. Right main landing gear – Check.
*5. Refueling panel – Check.
6. Forward gravity fuel cap – Secure.
7. Single point fuel access – Secure.

RIGHT SIDE – MAST (AREA 3).

*1. Main transmission – Check oil level.
*2. Nose gearbox – Check oil level; cowling secure.
3. Engine inlet – Unobstructed.
*4. Engine oil level – Check; secure door.
5. Upper flight controls and swashplate – Check.
6. Main rotor head and blades – Check.

RIGHT SIDE – WING (AREA 4).

1. Wing – Check.
O 2. Pylons – Check.
O 3. HELLFIRE – Check.
O 4. Rockets – Check.
5. Pitot tube – Check.
6. Wing lighting – Check.
7. Ammunition bay access – Secure.

RIGHT SIDE – REAR CENTER FUSELAGE (AREA 5).

1. Nacelle fire louvers – Check open.
*2. APU oil level – Check; secure door.
3. Aft gravity fuel cap – Secure.
4. Aft avionics bay – Check.
5. APU exhaust – Check.
6. IR suppressor / engine exhaust – Check.
*7. Utility hydraulic accumulator – Check, 2600 psi minimum.
8. Equipment stowage compartment – Check door security.

9. External power receptacle – Check.
10. Belly antennas – Check.

RIGHT SIDE – AFT FUSELAGE/EMPENNAGE (AREA 6).

1. Aft tail boom and empennage (right side) – Check.
2. Stabilator – Check condition.
3. Tail landing gear – Check.

LEFT SIDE – AFT FUSELAGE/EMPENNAGE (AREA 7).

1. Empennage (left side) – Check.
2. Tail rotor, controls, hub, and blades – Check.
3. Stabilator – Check.

LEFT SIDE – REAR CENTER FUSELAGE (AREA 8).

1. Aft tailboom – Check.
2. Transmission deck catwalk doors – Check security.
3. Equipment stowage compartment – Check; door secured.
4. IR suppressor/engine exhaust – Check.
5. Aft storage bay – Check.
6. Nacelle fire louvers – Check open.
*7. Fire extinguisher disc – Check that yellow disc visible.
8. Ammunition bay access – Secure.

LEFT SIDE – WING (AREA 9).

1. Wing – Check.
2. Wing lighting – Check.

3. Pitot tube – Check.

O 4. Pylons – Check.

O 5. HELLFIRE – Check same as right side.

O 6. Rockets – Check same as right side.

LEFT SIDE – MAST (AREA 10).

*1. Main transmission – Check oil level.

*2. Nose gearbox – Check oil level; cowling secured.

3. Engine inlet – unobstructed.

4. Engine oil level – Check.

5. Upper flight controls and swashplate – Check.

6. Main rotor head and blades – Check.

7. Air data sensor – Check.

LEFT SIDE – LOWER CENTER FUSELAGE AND NOSE (AREA 11).

1. Canopy – Check.

2. OAT gage extension – Check.

3. Static port – Unobstructed.

4. Utility HYD accumulator – Check.

5. Left main landing gear – Check.

6. Static ground cable – Check.

7. Forward avionics bay – Check.

8. Radar warning antenna – Check.

9. TADS/PNVS turrets – Check.

INTERIOR CHECK – PILOT.

*1. Cockpit door – As desired.

*2. Loose equipment – Secured.

3. Seat – Adjust to design eye position.

*4. Restraint harness – Fasten and adjust.

5. Inertial reel lock – Check.
6. Pedals – Check.
*7. Parking brake – Set.
8. EDGE LT PNL switch – As desired.
*9. Overhead circuit breakers – As desired.
10. Collective switches – As desired.
11. Auxiliary vent handle – Closed.
12. Utility light – As desired.
13. OAT gauge – Check.
14. ANTI-ICE panel switches – OFF.
*15. EXT LTS, INTR LTS – As desired.
*16. FUEL panel switches – Set.
17. PWR Levers – OFF.
18. ENG START switches – OFF.
*19. MASTER IGN switch – ON.
20. RTR BK – OFF.
21. ELEC PWR panel switches – OFF.
22. STORES JETT select switch – Guard covers down.
*23. ROCKET control panel – Set.
24. ECS control panel – Set.
25. TAIL WHEEL switch – LOCK.
*26. CANOPY JETTISON pin – Remove and stow.
27. FIRE CONTROL panel – Set.
28. Magnetic compass – Check.
29. BRU – Check.
30. Instrument test panel switch – As desired.
31. Flight instruments – Check.

32. Clock – Set.
33. Accelerometer – Reset.
34. HARS – OFF.
35. EMER HYD switch – OFF.
36. COMM CONT panel switches – As desired.
37. Right console avionics – OFF.

BEFORE STARTING APU – PILOT.

*1. BATT / EXT PWR switch – BATT or EXT as required.
2. ICS system – Check.
*3. MASTER CAUTION / WARNING panel – Check.
4. MASTER CAUTION / WARNING press to test – Check.
5. CAUTION / WARNING panel – Check.
6. Fire Detectors – Test.
7. INSTRUMENT TEST PANEL – Test.

STARTING ENGINES – EXTERNAL PRESSURIZED AIR SOURCE – PILOT.

1. External air source – Connected.
2. Pressurized air – Verify available.
★ 3. Engines – Start.
4. GEN 1 and GEN 2 switches – GEN.
5. EXT PWR / BATT switch – BATT.
6. External power – Disconnect.

7. External air source – Disconnect.
8. Continue with AFTER STARTING APU – Pilot and CPG.

*STARTING APU – PILOT.

1. Fire guard – Posted, if available.
2. APU – Start.
3. GEN 1 and GEN 2 switches – GEN.
4. EXT PWR / BATT switch – BATT.
5. External power – Disconnect.

*AFTER STARTING APU – PILOT.

1. PNVS – As required.
2. Standby attitude indicator – Uncage.
3. VDU – Set.
4. RAD ALT – ON.
5. Avionics – As desired.
6. Canopy door – Closed.
7. Control sweep and trim check – Perform.
8. HARS control switch – FAST or NORM.
- ★ 9. IHADSS Boresight – As required.
- ★ 10. FLIR operational check – As required.

*BEFORE STARTING ENGINES – PILOT.

1. SHAFT DRIVEN COMP light – Check off.
2. Anti-collision – As desired.

*STARTING ENGINES – PILOT.

1. Area – Clear.
2. RTR BK switch – OFF or LOCK.
★ 3. First engine – Start.
4. ANTI-ICE panel ENG INLET switch – As required.
5. RTR BK switch – OFF.
6. PWR lever – FLY.
★ 7. Second engine – Start.
8. PWR lever – FLY.
9. N_P and N_R – 100 percent.
10. Caution warning lights – Check.

ENGINE RUNUP – PILOT.

1. Engine overspeed – Test ENG 1 and ENG 2.
2. Engine ECU lockout system – Check ENG 1 and ENG 2.
* 3. APU control switch – OFF.

*BEFORE TAXI CHECK.

1. Canopy – Secured.
2. Armament and pylon safety pins – Removed.
3. Chocks and external ICS cords – Removed.
4. HARS control switch – Check aligned then OPR.
5. DASE – As desired.
6. EXT LT – As desired.
7. PARK BRK – Release.
8. TAIL WHEEL switch – UNLOCK.

*TAXI CHECK.

1. Wheel brakes – Check.
2. Engine / rotor instruments – Check.
3. Flight instruments – Check.

ENGINE HEALTH CHECK (HIT).

Perform for first flight of day. Refer to HIT log in aircraft logbook.

*BEFORE TAKEOFF CHECK.

1. HARS switch – Verify OPR.
2. Weapons systems – Safe.
3. TAIL WHEEL switch – LOCK.
4. Systems – check.
5. Power check.

INTERIOR CHECK – COPILOT/GUNNER.

*1. Canopy door – As desired.
*2. Loose equipment – Secured.
3. Seat – Adjust to design eye position.
*4. Restraint harness – Fasten.
5. Inertial reel lock – Check.
6. Pedals – Check.
7. Collective switches – As desired.
*8. Circuit breakers – As desired.
9. Utility light – As desired.
*10. INTR LTS – As desired.
*11. FUEL panel switches – Set.
12. EMER HYD PWR – OFF, guard down.
13. BAT OVRD – NRML, guard down.

14. ANTI-ICE panel switches – Set.
15. AUX panel switches – Set.
16. RECORDER – As desired.
17. MSL panel – Set.
18. DATA ENTRY keyboard – OFF.
*19. CANOPY JETTISON pin – Remove and stow.
20. FIRE CONTROL panel switches – Set.
21. Engine instrument test panel switch – As desired.
22. Engine instruments – Check.
23. Flight instruments – Check.
24. Clock – Set.
25. LT – OFF.
26. COMM CONT panel switches – As desired.
27. Right console avionics – OFF.
28. DOPPLER mode select switch – OFF.

BEFORE STARTING APU – COPILOT/GUNNER.

*1. **MASTER CAUTION/WARNING** panel – Check.
2. **MASTER CAUTION/WARNING** panel – PRESS-TO-TEST.
3. CAUTION / WARNING panel – Check.
4. INSTRUMENT TEST PANEL switch – TEST.

*AFTER STARTING APU – COPILOT/GUNNER.

1. Canopy Door – Closed.
2. Avionics – As desired.
3. ADSS – ON.
4. FC SYM GEN – As required.

5. IHADSS – As required (announce to pilot).
6. TADS – As required.
★ 7. Fire control system – Enter data / interrogate as desired.
★ 8. IHADSS – Boresight.
9. Doppler – Program as desired.
★ 10. TADS operational checks.
★ 11. TADS internal boresight – As required.
★ 12. TADS outfront boresight – As required.
★ 13. FLIR operational check.
14. Weapons systems – As desired.

BEFORE LANDING CHECK.

1. Weapons systems – Safe.
2. TAIL WHEEL switch – LOCK.
3. PARK BRK – As required.

AFTER LANDING CHECK.

1. TAIL WHEEL switch – UNLOCK.
2. EXT LTS – As required.
3. Avionics – As required.

ENGINE SHUTDOWN – PILOT.

1. TAIL WHEEL switch – LOCK.
2. PARK BK – Set.
3. APU – START.
4. Weapons systems – Secure.
5. DASE Release switch – Press.
6. STBY ATTD IND – Cage.

7. VDU – OFF.
8. RAD ALT – OFF.
9. HARS – OFF.
10. APU ON, caution light ON.
11. SDC caution light – Extinguished.
12. PWR levers – OFF after engines have cooled for two minutes.
13. FUEL panel switches – Set.
14. TGT – Monitor.
15. RTR BK switch – BRAKE, below 50% N_R.
16. Avionics – OFF.
17. Light switches – OFF.
18. RTR BK switch – OFF when rotor stops.
19. Confirm with CPG that shutdown is complete. (AND BLANK)
20. GEN switches – OFF.
21. APU control switch – OFF.
22. BATT / EXT PWR switch – OFF.
23. CANOPY JETTISON pin – Install.

ENGINE SHUTDOWN – COPILOT/GUNNER.

1. LT – OFF.
2. SIGHT SELECT – STBY.
3. TADS – OFF.
4. IHADSS – OFF.
5. FC SYM GEN – OFF.
6. Weapons Select – OFF.
7. CPG ARM / SAFE – OFF.
8. PLT/GND ORIDE – OFF.

9. ADSS – OFF.
10. Avionics – OFF.
11. Canopy jettison pin – Install.

BEFORE LEAVING THE HELICOPTER.

1. Armament and pylon safety pins – Installed.
2. Conduct walkaround.
3. Complete forms.
4. Secure helicopter – As required.

THRU FLIGHT CHECKS

BEFORE EXTERIOR CHECK.

Helicopter covers, locking devices, tiedowns and ground cables – removed and stowed, pylon safety pins installed.

RIGHT SIDE – LOWER CENTER FUSELAGE.

Refueling panel – Check.

RIGHT SIDE – MAST

1. Main transmission – Check oil level.
2. Nose gearbox – Check oil level; cowling secured.
3. Engine oil level – Check; secure door.

RIGHT SIDE – REAR CENTER FUSELAGE.

1. APU oil level – Check; secure door.
2. Utility hydraulic accumulator – Check, 2600 psi minimum.

LEFT SIDE – REAR CENTER FUSELAGE.

Fire extinguisher disc – Check that yellow disc visible.

LEFT SIDE – MAST.

1. Main transmission – Check oil level.
2. Nose gearbox – Check; cowling secure.

INTERIOR CHECK – PILOT.

1. Cockpit door – As desired.
2. Loose equipment – Secured.
3. Restraint harness – Fasten and adjusted.
4. Parking brake – Set.
5. Overhead circuit breakers – As desired.
6. EXT LTS, INTR LTS – As desired.
7. FUEL panel switches – Set.
8. MASTER IGN switch – ON.
9. ROCKET control panel – Check.
10. CANOPY JETTISON pin – Remove and stow.

BEFORE STARTING APU – PILOT.

1. BATT/EXT PWR switch – BATT or EXT, as required.
2. MASTER CAUTION / WARNING panel – check.

STARTING APU – PILOT.

1. Fire guard – Posted. If available.
2. APU – Start.
3. GEN 1 and GEN 2 switches – GEN.
4. EXT PWR / BATT switch – BATT.
5. External power – Disconnect.

AFTER STARTING APU – PILOT.

★ 1. PNVS – As required.
2. Standby attitude indicator – Uncage.
3. VDU – Set.
4. RAD ALT – On.
5. Avionics – As desired.
6. Canopy door – Closed.
7. Control sweep and trim check – Perform.
8. HARS control switch – FAST or NORM.
★ 9. IHADSS Boresight – As required.
★ 10. FLIR operational check – As required.

BEFORE STARTING ENGINES – PILOT.

1. SHAFT DRIVEN COMP light – Check off.
2. Anti-collision – As desired.

STARTING ENGINES – PILOT.

1. Area – Clear.
2. RTR BK switch – OFF or LOCK.
★ 3. First engine – Start.
4. ANTI-ICE panel ENG INLET switch – As desired.
5. RTR BK switch – OFF.
6. PWR lever – FLY.
★ 7. Second engine – Start.
8. PWR lever – FLY.
9. N_P and N_R – 100 percent.
10. Caution warning lights – Check.

ENGINE RUNUP – PILOT.

1. APU control switch – OFF.

BEFORE TAXI CHECK.

1. Canopy – Secured.
2. Armament and pylon safety pins – Removed.
3. Chocks and external ICS cords – Removed.
4. HARS control switch – Check aligned then OPR.
5. DASE – As desired.
6. EXT LTS – As desired.
7. Parking brake – Release.
8. TAIL WHEEL switch – UNLOCK.

TAXI CHECK.

1. Wheel brakes – Check.
2. Engine / rotor instruments – Check.
3. Flight instruments – Check.

BEFORE TAKEOFF CHECK.

1. HARS switch – Verify OPR.
2. Weapons System – SAFE.
3. TAIL WHEEL switch – LOCK.
4. Systems – Check.
5. Power checks – Checked.

INTERIOR CHECK – COPILOT/GUNNER.

1. Canopy door – As desired.
2. Loose equipment – Secure.
3. Restraint harness – Fasten and adjust.
4. Circuit breakers – As desired.
5. INTR LTS – As desired.
6. FUEL panel switches – Set.
7. Canopy jettison pin – Remove and stow.

BEFORE STARTING APU – COPILOT/GUNNER.

1. Master caution/warning panel – Check.

AFTER STARTING APU – COPILOT/GUNNER.

1. Canopy closed.
2. Avionics – As desired.
3. ADSS – On.
4. FC SYM GEN – As required.
5. IHADSS – As required.
6. TADS – As required.
7. Fire control system – Enter data as desired.
★ 8. IHADSS – Boresight – As required.
9. Doppler – ON (Program as desired).
★ 10. TADS operational checks – As required.
★ 11. TADS internal boresight – As required.
★ 12. TADS outfront boresight – As required.
★ 13. FLIR operational check – As required.
14. Weapons systems – As desired.

ENGINE

EMERGENCY ENGINE SHUTDOWN.

1. PWR lever (affected engines) – OFF.
2. ENG FUEL switch (affected engines) – OFF.

SINGLE-ENGINE FAILURE LOW ALTITUDE/ LOW AIRSPEED AND CRUISE.

If continued flight is not possible.

Land as soon as possible.

If continued flight is possible.

Land as soon as practicable.

DUAL ENGINE FAILURE LOW ALTITUDE/LOW AIRSPEED AND CRUISE.

1. Autorotate.
2. Chop collar - Reset.

HIGH RPM ROTOR (WARNING LIGHT ON) N_P FAILED HIGH.

1. Collective – Adjust to maintain N_R to within limits.

   If condition persists:

2. PWR lever (affected engine) – Retard to equalize torque on both engines.
3. Land as soon as practicable.

LOW RPM ROTOR (WARNING LIGHT ON) N_P FAILED LOW.

1. Collective – Adjust to maintain N_R to within limits

If condition persists:

2. PWR lever (affected engine) – LOCKOUT – then retard to equalize torque output of both engines

If manual control is not possible:

3. EMER ENGINE SHUTDOWN (affected engine)
4. Land as soon as practicable

ENGINE COMPRESSOR STALL.

1. Collective – Reduce.

If condition persists:

2. PWR lever (affected engine) – Reduce. (TGT should decrease.)
3. PWR lever (affected engine) – FLY. If TGT has decreased and there is no further evidence of a stall, continue flight.

If stall condition recurs:

4. EMER ENG SHUTDOWN (affected engine)
5. Land as soon as practicable

ROTORS, TRANSMISSIONS, AND DRIVE SYSTEMS

LOSS OF TAIL ROTOR THRUST IN CRUISE FLIGHT.

Continued Flight Possible

1. Airspeed - 80 KIAS minimum (until 10 to 20 feet above touchdown).
2. Wing stores jettison - As appropriate.
3. PWR Levers - Reduce as necessary (5 to 10 feet above touchdown).

Continued Flight Not Possible

1. Autorotate.
2. Chop Collar - Chop.
3. Wing stores jettison - As appropriate.
4. PWR Levers - OFF (Prior to touchdown).

LOSS OF TAIL ROTOR AT LOW AIRSPEEDS/ HOVER

1. Collective - Reduce.
2. PWR Levers - OFF (5 to 10 feet above touchdown).

FIRE

ENGINE/FUSELAGE FIRE ON GROUND.

If ENG FIRE PULL handle illuminates or if fire is observed

1. PWR levers – OFF.
2. Illuminated ENG FIRE PULL handle – Pull if applicable.
3. FIRE BTL switch – Activate, if applicable.

APU COMPARTMENT FIRE.

If fire is observed in APU compartment or if APU FIRE PULL handle illuminates.

1. APU FIRE PULL handle – Pull.
2. FIRE BTL switch – Activate.

ENGINE FIRE IN FLIGHT.

1. PWR lever (affected engine) – OFF.
2. Illuminated ENG FIRE PULL handle – Pull.
3. FIRE BTL switch – Activate.
4. Land as soon as possible.

ELECTRICAL FIRE IN FLIGHT.

1. GEN switches – OFF.
2. Land as soon as possible.

SMOKE AND FUME ELIMINATION.

1. Airspeed – Slow to 20 KIAS maximum.
2. Canopy door (affected crew position) – Open to intermediate position.
3. Land as soon as possible.

LANDING AND DITCHING

EMERGENCY LANDING IN WOODED AREAS (POWER OFF).

1. Autorotate
2. Collective - Adjust to maximum before main rotor contacts tree.

DITCHING (POWER ON).

1. Approach to hover
2. Canopies - Jettison
3. Pilot shoulder harness - Lock
4. CPG - Exit helicopter
5. Hover downwind a safe distance
6. PWR levers - OFF
7. Perform hovering autorotation.
8. Cyclic - Position in direction of roll
9. Exit when main rotor has stopped.

DITCHING (POWER OFF).

1. Autorotate
2. Canopies - Jettison
3. Cyclic - Position in direction of roll
4. Exit when main rotor has stopped

EMERGENCY EXIT

1. Helmet visor - Down.
2. CANOPY JETTISON handle - Either crew member turn 90 degrees, release, then push.

FLIGHT CONTROLS

FLIGHT CONTROL MALFUNCTIONS.

1 Land as soon as possible.
2 EMER ENG(s) SHUTDOWN after landing.

STABILATOR AUTOMATIC MODE FAILURE.

1 STAB reset button – Press
If automatic mode not restored;
2 Airspeed – Do not exceed placard limits.

STABILATOR MANUAL MODE FAILURE.

1 Airspeed – Use placard limits.
2 Land as soon as practicable.

DASE MALFUNCTION.

1 ASE release SW – depress.
2 SAS reengage unaffected axes.

MISSION EQUIPMENT

ECS MALFUNCTION.

1. ECS switch – STBY FAN.
2. Emergency crewstation ventilation door – Open.

PNVS FAILURE

Pilot NVS Select switch – TADS.

PILOT IHADSS/HDU FAILURE.

1. Establish visual flight.
2. VDU control switch – PLT.
3. ACQ SEL – NVS FXD.

OR

CPG

1. CPG SIGHT SEL switch – NVS.
2. NVS select switch – PNVS or TADS.
3. CPG assume helicopter control.

WING STORES JETTISON.

1. Airspeed – 120 KIAS maximum.
2. Selected STORES JETT switches – Activate.

If store(s) fail to separate,

3. ST JETT – Press.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES

WORD SEGMENT	CORRECTIVE ACTION
MASTER CAUTION WARNING PANEL	
MASTER CAUTION	Check Master/Caution Warning and Caution/ Warning panels for other lights. If no other light is flashing land as soon as possible.
LOW RPM ROTOR	See Low RPM Rotor Warning Light On/Np Failed Low.
FIRE APU	See APU Compartment Fire.
ENGINE 1 OUT	See Single-Engine Failure Low Altitude/Low Airspeed and Cruise.
ENGINE CHOP	Chop collar – Reset.
ENGINE 2 OUT	See Single-Engine Failure Low Altitude/Low Airspeed and Cruise.
	NOTE
	ENG 1 and 2. See Dual-Engine Failure Low Altitude/Low Airspeed and Cruise.
HIGH RPM ROTOR	See High RPM (Rotor Light On) Np Failed High.
BUCS FAIL	BUCS circuit breaker – Out.
CAUTION/WARNING PANELS	
FUEL LOW FWD	Information/system status.
EXT EMP	Information/system status.
FUEL XFR	Information/system status.
PRI HYD PSI	Land as soon as possible.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES (cont)

WORD SEGMENT	CORRECTIVE ACTION
UTIL HYD PSI	Land as soon as possible.
MAN STAB	With audio – Land as soon as practicable. Light only – Information/system status.
BUCS ON	Information/system status.
ADS	Information/system status.
FUEL LOW AFT	Information/system status.
BOOST PUMP ON	Information/system status.
OIL LOW PRI HYD	Land as soon as practicable.
OIL LOW UTIL HYD	Land as soon as practicable.
PRI HYD PSI and UTIL HYD PSI	EMER HYD switch on. Land as soon as possible.

NOTE

Oil low PRI and UTIL HYD – Land as soon as possible.

Oil low UTIL and PRI HYD – Land as soon as possible.

OIL PSI ACC PUMP	Land as soon as practicable.
ASE	Land as soon as practicable.
REFUEL VALVE OPEN	Information/system status.
CHIPS NOSE GRBX 1	Power lever – Idle when conditions permit. Land as soon as practicable.
OIL BYP PRI HYD	Land as soon as practicable.
OIL BYP UTIL HYD	Land as soon as practicable.
CHIPS NOSE GRBX 2	Power lever – Idle when conditions permit. Land as soon as practicable.
CHIPS ENG 1	Power lever – Idle when conditions permit. Land as soon as practicable.
OIL PSI NOSE GRBX 1	Power lever – Idle when conditions permit. Land as soon as practicable.
OIL PSI MAIN XMSN 2	Land as soon as practicable.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES (cont)

WORD SEGMENT	CORRECTIVE ACTION
	NOTE
	Oil PSI MAIN XMSN 1 and 2 – Land as soon as possible
OIL PSI NOSE GRBX 2	Power lever – Idle when conditions permit. Land as soon as practicable.
CHIPS ENG 2	Power lever – Idle when conditions permit. Land as soon as practicable.
OIL PSI ENG 1	EMER ENG SHUTDOWN when conditions permit. Land as soon as practicable.
OIL HOT NOSE GRBX 1	Power lever – Idle when conditions permit. Land as soon as practicable.
OIL HOT MAIN XMSN 1	Land as soon as practicable.
OIL HOT MAIN XMSN 2	Land as soon as practicable.
	NOTE
	OIL HOT MAIN XMSN 1 and 2 – Land as soon as possible.
OIL HOT NOSE GRBX 2	Power lever - Idle when conditions permit. Land as soon as practicable.
OIL PSI ENG 2	EMER ENG SHUTDOWN when conditions permit. Land as soon as practicable.
OIL BYP ENG 1	Power lever – Idle when conditions permit. Land as soon as practicable.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES (cont)

WORD SEGMENT	CORRECTIVE ACTION
GEN 1 and GEN 2	Land as soon as practicable.
RECT 1 and RECT 2	Land as soon as practicable.
GEN 1	GEN switch--OFF/RESET--GEN. If power is not restored – GEN switch--OFF/RESET.
RECT 1	Information/system status.
GEN 2	GEN switch--OFF/RESET--GEN. If power is not restored – GEN switch--OFF/RESET.
RECT 2	Information/system status.
OIL BYP ENG 2	Power lever – Idle when conditions permit. Land as soon as practicable.
FUEL BYP ENG 1	Power lever – Idle when conditions permit. Land as soon as practicable.
HOT RECT 1	Circuit breaker – Out.
CHIPS MAIN XMSN	Land as soon as possible.
TEMP INT	Land as soon as practicable.
TEMP TR	Land as soon as practicable.
HOT RECT 2	Circuit breaker – Out.
FUEL BYP ENG 2	Power lever – Idle when conditions permit. Land as soon as practicable.
FUEL PSI ENG 1	Land as soon as practicable.
PRI MUX	Information/system status.
RDR JAM	Information/system status.
SHAFT DRIVEN COMP	Land as soon as possible.
VIB GRBX	Land as soon as possible.
HOT BAT	BAT switch – OFF. Land as soon as practicable.
CHARGER	Information/system status.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES (cont)

WORD SEGMENT	CORRECTIVE ACTION
FUEL PSI ENG 2	Land as soon as practicable.
GUN	Information/system status.
ROCKET	Information/system status.
IR JAM	Information/system status.
PNVS	See PNVS failure.
BLADE ANTI-ICE FAIL	Information/system status.
ENG ICE	Anti-ice panel switches – As desired.
FUEL PSI ENG 1 and ENG	Fuel crossfeed switch-AFT TK Fuel Boost switch - ON. Land as soon as possible.
RTR BK	RTR BK switch – OFF. Land as soon as possible
CANOPY	Information/system status.
EXT PWR	Information/system status.
MISSILE	Information/system status.
IFF	Information/system status.
ECS	Information/system status.
TADS	Information/system status.
CANOPY ANTI-ICE FAIL	Information/system status.
ENG 1 ANTI-ICE	Information/system status.
ENG ANTI-ICE	Information/system status.
APU ON	Information/system status.
APU FAIL	Information/system status.
– (SPARE)	Land as soon as possible.
CPG PANEL ONLY	
PRI HYD	Coordinate actions with pilot.
UTIL HYD	Coordinate actions with pilot.
MAIN XMSN 1	Coordinate actions with pilot.
MAIN XMSN 2	Coordinate actions with pilot.
ENG 1	Coordinate actions with pilot.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES (cont)

WORD SEGMENT	CORRECTIVE ACTION
ENG 2	Coordinate actions with pilot.
ELEC SYS FAIL	Coordinate actions with pilot.
ENG ANTI-ICE	Coordinate actions with pilot.
VOICE CIPHER	Information/system status

NOTE

Illumination of a light that is Information/System Status shows condition of System Components. Mission accomplishment may be degraded. Mission requirements will dictate further actions.

NOTE

For conditions which will cause the lights to illuminate, see Table 2-4/2-5/2-6.

PERFORMANCE DATA
IHADSS BORESIGHT – PILOT.

1. VID SEL – GRAY SC.
2. Adjust brightness and contrast.
3. VID SEL – PLT.
4. SYM BRT – Adjust.
5. IHADSS BRSIT – ON.
6. INST lights – Adjust BRV intensity.
7. Align HMD reticle with BRU.
8. HMD BRSIT – Actuate, then release.
9. IHADSS BRSIT – OFF.
10. INST lights – As desired.

STARTING ENGINE (NO. 1 or NO. 2).

1. START switch – START.
2. PWR lever – IDLE.
3. ENG OIL pressure gauge – Monitor.
4. TGT – Monitor.
5. N_G – Monitor.
6. Caution warning lights – Check.

FIRE CONTROL SYSTEM – DATA ENTRY.

1. Data entry keyboard switch – SP1.
2. Enter time ex – 17:14:30.
3. Enter PPOS ex – 115QG55385172.
4. Enter field elevation ex – ALT0820.
5. Enter spheroid ex – SPHCL6.

6. Enter magnetic variation ex – MVE13.8.
7. Enter grid convergence ex – E01.48.
8. Data entry keyboard switch – FDLS
   execute desired test.
9. Data entry keyboard – TRGT
   enter mission preplanning coordinate data.
10. Data Entry Keyboard – Codes
    enter desired laser codes.

IHADSS BORESIGHT – CPG.

1. SIGHT SEL – HMD, HMD TADS, or NVS.
2. GS – Press.
3. Adjust brightness and contrast.
4. VID SEL – TADS.
5. SYM BRT – Adjust.
6. BRSIT IHADSS – ON.
7. INST lights – Adjust BRU intensity.
8. Align HMD reticle with BRU.
9. HMD BRSIT – Actuate, then release.
10. IHADSS BRSIT – OFF.
11. INST lights as desired.

TADS OPERATIONAL CHECKS – CPG.

1. TADS – TADS or FLIR OFF, as desired.
2. GS – PRESS.
3. Adjust brightness and contrast as desired on heads up and heads down displays.

4. VID SEL – TADS.
5. SIGHT SEL – TADS.
6. SLAVE – Actuate, turret should slave to fixed forward.
7. SLAVE – Actuate, turret should return to manual track.
8. Thumbforce controller – Exercise turret.
9. Field of view select – Evaluate various FOVs.
10. IAT/MAN – Engage image auto tracker and check for proper function.
11. Sensor select – DVO.
12. Field of view select – Evaluate various FOVs.
13. Sensor select – FLIR.
14. Adjust gain and level for optimum image, then engage ACM.
15. Field of view select – Evaluate various FOVs.
16. IAT/MAN – Engage image auto tracker and check for proper performance.
17. Polarity reversal – Check, leave in white hot.
18. Sensor select – DTV or FLIR.
19. Drift null – As desired.

TADS INTERNAL BORESIGHT.

1. DTV
   a. PLT/GND ORIDE switch – As required.
   b. CPG ARM – ARM.
   c. LSR SEL – ON.
   d. SIGHT SEL – TADS.

e. BRSIT – TADS.

f. Sensor select – DTV.

g. Field of view select – N.

h. Tracker PLRT – W/B.

i. Laser trigger – Press.

j. BRSIT enable – UP position, observe tracking gates capture laser spot, continue to fire laser until tracking gates disappear.

k. BRSIT enable – Center position.

l. Laser trigger – Release.

m. Field of view select – Z.

n. Repeat steps i through l.

2. FLIR

a. Sensor select – FLIR.

b. Field of view select – N.

c. Adjust FLIR level fully counterclockwise.

d. Adjust FLIR gain midrange.

e. Laser trigger – Press.

f. Observe laser spot and optimize.

g. BRSIT enable – UP position, observe tracking gates capture laser spot, continue to fire the laser until tracking gates disappear.

h. BRSIT enable – Center position.

i. Field of view select – Z.

j. Repeat steps e through h.

k. CPG ARM – SAFE.

3. DVO
   a. Sensor select – DVO..
   b. Field of view select – N.
   c. Observe position of DVO crosshairs, if coincident with DTV reticle go to step g, below.
   d. BRSIT enable – DOWN position.
   e. DVO BRSIT – Adjust DVO crosshairs into coincidence with DTV reticle.
   f. BRSIT enable – Center position.
   g. BRSIT – OFF.
   h. ACQ SEL – FXD.
   i. Slave switch – Press, TADS returns to the fixed forward position.

TADS OUTFRONT BORESIGHT

WARNING

The narrow and zoom FOV TADS FLIR has inaccuracies for lasing and weapons direction following TADS internal boresight. TADS outfront boresight validation and adjustment, if necessary, shall be performed prior to using the TADS FLIR imagery for laser or weapons operation.

1. Position helicopter, on the ground, over identified location for this procedure.
2. Enter, manually, the range from helicopter to the outfront boresight target.

3. Observe the outfront boresight target in NFOV FLIR, adjust gain and level for optimum autotracker image. Engage IAT.
4. Sensor select – DVT, observe light source.
5. If not precisely centered on the TADS reticle execute the following.
6. BRSIT TADS – TADS.
7. Boresight enable – UP.
8. Adjust AZ and EL pots to center the light source on the reticle.
9. Boresight enable – Center.
10. BRSIT TADS – OFF.
11. IAT – OFF.
12. Procedure complete, continue as desired.

FLIR OPERATIONAL CHECK – PILOT/CPG.

1. SIGHT SEL – NVS, check turret function.
2. Adjust gain and level for optimum image.
3. Verify capability to select the various modes of flight symbology.
4. Polarity reversal – Check.
5. Registration – Check.
6. Alternate sensor – Check

MANUAL DRIFT NULL.

1. SLAVE switch – Press and verify dotted crosshair is present on selected display (HOD or HDD).
2. SIGHT SEL – TADS.
3. Verify TADS turret slews to fixed forward position by observing solid crosshair coming to center of display and cueing LOS centering on cueing dot.
4. SLAVE switch – Press.
5. Sensor select switch – TV or FLIR.
6. Field of view – N.
7. Aim reticle at an easily observed object.
8. BRSIT ENABLE switch – Up position, wait 5 seconds then adjust left and right thumbwheel controls for drift null.
9. BRSIT ENABLE switch – Center position.

PECHAN REALIGNMENT.

NOTE

This procedure realigns the voltages used to erect the Pechan (DVO) lens. It should be used in order to establish a "Real World" relationship when viewing through the DVO. Should realignment be unsuccessful, refer to TM 9-1270-476-20.

1. Sensor select - DVO.
2. Field of view - N.
3. TADS turret - Manual control.
4. BRSIT ENABLE - ON.
5. Left thumbwheel control - Adjust as required to align horizontal crosshair with horizon.
6. BRSIT ENABLE - OFF.
7. Field of view - W.
8. Recheck alignment of crosshair and horizon.
   a. If satisfactorily aligned, procedure is complete. Select desired operating mode.
   b. If not satisfactorily aligned:
      (1) BRSIT ENABLE - ON.
      (2) Adjust right thumbwheel control as required to align horizontal crosshair with horizon.
      (3) BRSIT ENABLE - OFF.
      (4) Field of view - N.
      (5) Reverify alignment of NFOV. If satisfactory, procedure is complete. If unsatisfactory, repeat steps 4 through 8 above as required If still unsatisfactory, see note above.

MANUAL BORESIGHT ADJUST.

NOTE

The manual boresight procedure is used only to recapture or center the laser spot. It is not an acceptable boresight procedure for normal flight operations.

1. LSR select switch – ON.
2. Sensor select switch – FLIR.
3. IAT Polarity – WHT.
4. FLIR PLRT – Press to select white hot.
5. Field of view – N.
6. GAIN – Midrange.
7. LVL – Fully counterclockwise.

WARNING

Ensure proper laser safety procedures are followed.

8. LASER TRIG – Press to second detent and hold. Verify the laser spot is visible. Adjust GAIN and LVL for brightest laser spot with the least background noise.

NOTE

If the laser spot is too weak or not visible, perform Q-update.

9. BRSIT ENABLE – Up for 5 seconds then move to center position and continue firing laser. After 5 seconds, the left and right thumbwheel controls will be active and the laser spot can be adjusted in elevation and azimuth.

10. LASER TRIG – Release.

11. LSR switch – OFF.

CUE UPDATE PROCEDURE.

NOTE

The CUE update procedure should be accomplished whenever the TADS FLIR is reported as being unable to be internally boresighted. Cue update must always be followed by a check of the outfront boresight. If outfront boresight alignment is not acceptable, then the outfront boresight procedure must be accomplished. Once the CUE update procedure has been accomplished and the TADS FLIR still cannot be boresighted, report discrepancy on 2408-13.

1. SIGHT SEL switch – TADS.

2. Sensor Select switch – DTV.

3. Field of View Select switch – W.

4. BRSIT – TADS.

5. SLAVE switch – Actuate. Verify internal boresight message replaced by cue update message.

6. If reticle does not appear centered on the black cross execute the following:

   a. BRSIT enable – UP.

   b. Use thumbforce controller to position DTV reticle in proximity to the black cross.

   c. BRSIT enable – Center.

   d. SLAVE switch – Actuate. Verify cue update message replaced by internal boresight message.

   e. BRSIT TADS – OFF. Procedure complete, continue as desired.

ARMAMENT

M-230E1, 30MM GUN SYSTEM – IN FLIGHT PROCEDURES.

1. Master/CPG ARM – ARM.
2. Gun Select switch – As desired.
3. Crew member desiring to fire – Establish range to target and track target with select sight.
4. WAS – GUN.
5. WEAPONS trigger – Press, continue to fire as required.
6. WAS – Deselect gun.

AERIAL ROCKET CONTROL AND DELIVERY SYSTEM – IN FLIGHT PROCEDURES COOPERATIVE ENGAGEMENT MODE.

1. CPG
   a. Master/CPG ARM – ARM.
   b. Rocket select switch – As desired.
   c. Desired target – Acquire and track.
   d. ORT WAS – RKT.
   e. Laser trigger – Press, establish range aircraft to target.
   f. On completion of engagement: ORT WAS – Center position.
2. PILOT
   a. Rocket Select switch – As desired.
   b. Rockets control panel – Set.
   c. WAS – RKT.
   d. Aline rocket steering symbology.
   e. WEAPONS trigger – Press.
   f. WAS – RKT.

3. PILOT OR CPG ONLY MODE.
   a. MASTER/CPG ARM/SAFE – ARM.
   b. Rocket Select switch – As desired.
   c. Rockets control panel – Set.
   d. Crew member desiring to fire – Track target with HMD.
   e. WAS – RKT.
   f. Align rocket steering symbology.
   g. WEAPONS trigger – Press.
   h. WAS – Deselect rockets.

POINT TARGET WEAPONS SYSTEM – IN FLIGHT PROCEDURES.

1. MSL SEL – ON, observe "BIT IN PROGRESS".
2. TYPES OF ENGAGEMENTS.
   a. NORMAL MODE – LOBL.
      (1) UPR/LWR CHAN CODE – As desired.
      (2) UPR/LWR CHAN QTY – As desired.
      (3) MSL MODE – NORM.
      (4) CHAN SEL – Establish priority channel.
      (5) Observe AND for missile selection, coding, and ready status.
      (6) Lase target or call for remote designator.
      (7) Observe AND or HIGH ACTION display for proper missile track status.

(8) MASTER/CPG ARM/SAFE – ARM.

(9) ORT WAS – MSL.

(10) Pilot establish helicopter in constraints.

(11) WEAPONS Trigger – Press.

(12) If autonomously designating, continue lasing until missile impact.

b. NORMAL MODE – LOAL.

(1) UPR/LWR CHAN CODE – As desired.

(2) UPR/LWR CHAN QTY – As desired.

(3) MSL Mode – NORM.

(4) CHAN SEL – Establish priority channel.

(5) Observe AND or HIGH ACTION display for missile selection, coding, and ready status.

(6) LOAL – As desired.

(7) MASTER/CPG ARM/SAFE – ARM.

(8) WAS – MSL.

(9) Pilot establish helicopter in constraints.

(10) WEAPONS trigger – Press.

(11) Lase target or call for remote designator in adequate time for terminal guidance.

c. RIPPLE MODE – LOBL.

(1) UPR/LWR CHAN CODE – As desired.

(2) UPR/LWR CHAN QTY – As desired.

(3) MSL mode – RIPL.

(4) CHAN SEL – Establish priority channel.

(5) Observe AND for missile selection, coding, and ready status.

(6) Lase target or call for remote designator.

(7) Observe AND or HIGH ACTION display for missile system message.

(8) MASTER/CPG ARM/SAFE – ARM.

(9) WAS – MSL.

(10) Pilot establish the helicopter in constraints.

(11) WEAPONS trigger – Press.

(12) Pilot establish helicopter in constraints.

(13) Repeat steps 10 thru 12 until desired number of missiles have been fired.

d. RIPPLE MODE – LOAL.

(1) UPR/LWR CHAN CODE – As desired.

(2) UPR/LWR CHAN QTY – As desired.

(3) MSL mode – RIPL.

(4) CHAN SEL – Establish priority channel.

(5) Observe AND or HIGH ACTION display for missile selection, coding, ready status.

(6) LOAL – As desired.

(7) MASTER/CPG ARM/SAFE – ARM.

(8) WAS – MSL.

(9) Pilot establish helicopter in constraints.

(10) Weapons trigger – Press.

(11) Pilot establish helicopter in constraints for alternate channel.

(12) Weapons trigger – Press.

(13) Lase target or call for terminal guidance.

(14) Execute steps 9 thru 13 until desired number of missiles have been fired.

e. MISSILE SYSTEM SHUTDOWN PROCEDURES.

(1) MSL mode – STBY.

(2) LOAL – OFF.

(3) CHAN SEL – Actuate either direction.

(4) MSL SEL – OFF.

FUEL AND REARM

RAPID REFUELING.

1. TAIL WHEEL switch – LOCK.
2. PARK BK – Set.
3. Weapons SEL switches – OFF.
4. MASTER/CPG ARM/SAFE – OFF.
5. NO. 2 ENG PWR lever – OFF.
6. Monitor refueling.
7. On completion of refueling operations verify REFUEL VALVE OPEN caution light – OFF.
8. No. 2 engine – Start.
9. Weapons systems – As desired.

RAPID REARMING.

1. TAIL WHEEL switch – LOCK.
2. PARK BK – Set.
3. Armament and pylon safety pins – Installed.
4. Weapons SEL switches – OFF.
5. MASTER/CPG ARM/SAFE – OFF.
6. PLT/GND ORIDE – OFF.
7. Monitor rearming.
8. Armament and pylon safety pins – Removed.
9. Upon completion, arm weapons systems.

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		-60	-55	-50	-45	-40	-35	-30	-25	-20
0	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	81	81	82	83	83	84	85	85	86
	Q - IGE ~ %	73	73	74	75	75	76	76	77	77
500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	81	82	82	83	84	84	85	86	86
	Q - IGE ~ %	73	74	75	75	76	76	77	77	78
1000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	82	82	83	84	84	85	86	86	87
	Q - IGE ~ %	74	74	75	76	76	77	77	78	79
1500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	82	83	84	84	85	86	86	87	88
	Q - IGE ~ %	74	75	75	76	77	77	78	79	79
2000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	83	83	84	85	86	86	87	88	88
	Q - IGE ~ %	75	75	76	77	77	78	78	79	80
2500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	83	84	85	85	86	87	88	88	89
	Q - IGE ~ %	75	76	76	77	78	78	79	80	80
3000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	84	85	85	86	87	87	88	89	90
	Q - IGE ~ %	76	76	77	78	78	79	80	80	81
3500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	84	85	86	87	87	88	89	90	90
	Q - IGE ~ %	76	77	78	78	79	79	80	81	81
4000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	85	86	87	87	88	89	90	90	91
	Q - IGE ~ %	77	77	78	79	79	80	81	81	82
4500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	86	86	87	88	89	89	90	91	92
	Q - IGE ~ %	77	78	79	79	80	81	81	82	83
5000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	86	87	88	89	89	90	91	92	92
	Q - IGE ~ %	78	79	79	80	81	81	82	83	83

*GW ~ 100 LB = GW divided by 100 LB
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF

PRES ALT FT		FREE AIR TEMPERATURE °C								
		-20	-15	-10	-5	0	+ 5	+ 10	+ 15	+ 20
0	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	86	86	87	88	88	89	90	90	91
	Q - IGE ~ %	77	78	79	79	80	80	81	81	82
500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	86	87	88	88	89	90	90	91	92
	Q - IGE ~ %	78	79	79	80	80	81	81	82	83
1000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	87	88	88	89	90	90	91	92	92
	Q - IGE ~ %	79	79	80	80	81	81	82	83	83
1500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	88	88	89	90	90	91	92	92	93
	Q - IGE ~ %	79	80	80	81	82	82	83	83	84
2000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	88	89	90	90	91	92	92	93	94
	Q - IGE ~ %	80	80	81	81	82	83	83	84	84
2500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	89	90	90	91	92	92	93	94	95
	Q - IGE ~ %	80	81	81	82	83	83	84	85	85
3000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	90	90	91	92	92	93	94	95	95
	Q - IGE ~ %	81	81	82	83	83	84	85	85	86
3500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	90	91	92	92	93	94	95	95	96
	Q - IGE ~ %	81	82	83	83	84	85	85	86	86
4000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	91	92	92	93	94	95	95	96	97
	Q - IGE ~ %	82	83	83	84	85	85	86	86	87
4500	GW ~ 100 LB	176	176	176	176	176	176	176	176	173
	Q - OGE ~ %	92	92	93	94	95	95	96	97	95
	Q - IGE ~ %	83	83	84	85	85	86	87	87	86
5000	GW ~ 100 LB	176	176	176	176	176	176	176	174	170
	Q - OGE ~ %	92	93	94	95	95	96	97	96	94
	Q - IGE ~ %	83	84	85	85	86	87	87	87	85

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF

PRES ALT FT		FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
0	GW ~ 100 LB	176	176	176	176	176	176	169	162	155
	Q - OGE ~ %	91	92	92	93	94	94	89	85	80
	Q - IGE ~ %	82	83	83	84	84	84	80	76	72
500	GW ~ 100 LB	176	176	176	176	176	172	166	159	152
	Q - OGE ~ %	92	92	93	94	94	92	88	83	79
	Q - IGE ~ %	83	83	84	84	85	83	79	75	71
1000	GW ~ 100 LB	176	176	176	176	176	169	162	156	149
	Q - OGE ~ %	92	93	94	94	95	90	86	81	77
	Q - IGE ~ %	83	84	84	85	85	81	77	73	69
1500	GW ~ 100 LB	176	176	176	176	172	166	159	152	146
	Q - OGE ~ %	93	94	94	95	93	88	84	80	75
	Q - IGE ~ %	84	84	85	86	84	80	76	72	68
2000	GW ~ 100 LB	176	176	176	176	169	163	156	149	143
	Q - OGE ~ %	94	94	95	95	91	87	82	78	74
	Q - IGE ~ %	84	85	86	86	82	78	74	70	67
2500	GW ~ 100 LB	176	176	176	172	166	159	153	146	140
	Q - OGE ~ %	95	95	96	94	89	85	80	76	72
	Q - IGE ~ %	85	86	86	84	80	76	73	69	65
3000	GW ~ 100 LB	176	176	175	169	163	156	150	143	137
	Q - OGE ~ %	95	96	96	92	88	83	79	75	71
	Q - IGE ~ %	86	86	86	83	79	75	71	67	64
3500	GW ~ 100 LB	176	176	171	166	160	153	147	140	134
	Q - OGE ~ %	96	97	94	90	86	81	77	73	69
	Q - IGE ~ %	86	87	84	81	77	73	69	66	62
4000	GW ~ 100 LB	176	173	168	163	156	150	144	137	131
	Q - OGE ~ %	97	95	92	88	84	80	75	71	67
	Q - IGE ~ %	87	85	83	79	76	72	68	64	61
4500	GW ~ 100 LB	173	170	165	160	153	147	141	135	129
	Q - OGE ~ %	95	93	90	87	82	78	74	70	66
	Q - IGE ~ %	86	84	81	78	74	70	67	63	60
5000	GW ~ 100 LB	170	167	162	157	151	144	138	132	127
	Q - OGE ~ %	94	92	89	85	81	77	73	69	65
	Q - IGE ~ %	85	82	80	77	73	69	65	62	58

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF

PRES ALT FT		FREE AIR TEMPERATURE °C								
		-60	-55	-50	-45	-40	-35	-30	-25	-20
5000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	86	87	88	89	89	90	91	92	92
	Q - IGE ~ %	78	79	79	80	81	81	82	83	83
5500	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	87	88	88	89	90	91	92	92	93
	Q - IGE ~ %	78	79	80	80	81	82	83	83	84
6000	GW ~ 100 LB	176	176	176	176	176	176	176	176	176
	Q - OGE ~ %	88	88	89	90	91	92	92	93	94
	Q - IGE ~ %	79	80	80	81	82	82	83	84	85
6500	GW ~ 100 LB	176	176	176	175	175	175	176	175	175
	Q - OGE ~ %	88	89	90	90	90	91	93	93	94
	Q - IGE ~ %	80	80	81	81	81	82	83	84	84
7000	GW ~ 100 LB	176	174	173	172	171	171	172	172	171
	Q - OGE ~ %	89	88	88	88	89	89	91	91	92
	Q - IGE ~ %	80	80	79	80	80	81	82	82	83
7500	GW ~ 100 LB	173	171	170	169	168	168	169	169	168
	Q - OGE ~ %	87	87	86	87	87	88	89	90	90
	Q - IGE ~ %	79	78	78	78	78	79	80	81	81
8000	GW ~ 100 LB	170	168	166	165	165	165	166	165	165
	Q - OGE ~ %	86	85	85	85	85	86	88	88	88
	Q - IGE ~ %	77	77	77	77	77	78	79	79	80
8500	GW ~ 100 LB	167	164	163	162	162	162	163	162	162
	Q - OGE ~ %	84	83	83	83	84	85	86	86	87
	Q - IGE ~ %	76	75	75	75	76	76	77	78	78
9000	GW ~ 100 LB	164	161	160	159	159	159	160	159	159
	Q - OGE ~ %	83	82	82	82	82	83	84	85	85
	Q - IGE ~ %	75	74	74	74	74	75	76	76	77
9500	GW ~ 100 LB	161	158	157	156	156	156	157	156	156
	Q - OGE ~ %	81	80	80	80	81	81	83	83	84
	Q - IGE ~ %	73	72	72	72	73	73	75	75	75
10000	GW ~ 100 LB	158	155	154	153	153	153	154	153	153
	Q - OGE ~ %	80	79	79	79	79	80	81	82	82
	Q - IGE ~ %	72	71	71	71	71	72	73	73	74

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF

PRES ALT FT		FREE AIR TEMPERATURE °C								
		-20	-15	-10	-5	0	+ 5	+ 10	+ 15	+ 20
5000	GW ~ 100 LB	176	176	176	176	176	176	176	174	170
	Q - OGE ~ %	92	93	94	95	95	96	97	96	94
	Q - IGE ~ %	83	84	85	85	86	87	87	87	85
5500	GW ~ 100 LB	176	176	176	176	176	176	174	171	167
	Q - OGE ~ %	93	94	95	95	96	97	96	94	92
	Q - IGE ~ %	84	85	85	86	87	87	87	85	83
6000	GW ~ 100 LB	176	176	176	176	176	174	171	168	164
	Q - OGE ~ %	94	95	95	96	97	96	94	92	90
	Q - IGE ~ %	85	85	86	87	87	86	85	83	81
6500	GW ~ 100 LB	175	175	175	176	174	171	168	164	161
	Q - OGE ~ %	94	94	95	97	96	94	92	91	88
	Q - IGE ~ %	84	85	86	87	86	85	83	82	80
7000	GW ~ 100 LB	171	171	172	173	170	167	164	161	158
	Q - OGE ~ %	92	93	94	95	94	92	91	89	87
	Q - IGE ~ %	83	83	84	86	85	83	82	80	78
7500	GW ~ 100 LB	168	168	169	170	167	164	161	158	155
	Q - OGE ~ %	90	91	92	93	92	90	89	87	85
	Q - IGE ~ %	81	82	83	84	83	81	80	78	77
8000	GW ~ 100 LB	165	165	166	166	164	161	158	155	152
	Q - OGE ~ %	88	89	90	91	90	89	87	85	83
	Q - IGE ~ %	80	80	81	82	81	80	78	77	75
8500	GW ~ 100 LB	162	162	162	163	160	157	155	152	149
	Q - OGE ~ %	87	88	88	89	88	87	85	84	82
	Q - IGE ~ %	78	79	80	81	79	78	77	75	73
9000	GW ~ 100 LB	159	159	159	159	157	154	152	149	146
	Q - OGE ~ %	85	86	87	88	86	85	84	82	80
	Q - IGE ~ %	77	77	78	79	78	76	75	74	72
9500	GW ~ 100 LB	156	156	156	156	154	151	149	146	143
	Q - OGE ~ %	84	84	85	86	85	83	82	80	78
	Q - IGE ~ %	75	76	77	77	76	75	74	72	70
10000	GW ~ 100 LB	153	153	153	153	151	148	146	143	140
	Q - OGE ~ %	82	83	83	84	83	82	80	78	77
	Q - IGE ~ %	74	74	75	76	75	73	72	71	69

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF

PRES ALT FT		FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
5000	GW ~ 100 LB	170	167	162	157	151	144	138	132	127
	Q - OGE ~ %	94	92	89	85	81	77	73	69	65
	Q - IGE ~ %	85	82	80	77	73	69	65	62	58
5500	GW ~ 100 LB	167	163	159	153	147				
	Q - OGE ~ %	92	90	87	83	79				
	Q - IGE ~ %	83	81	78	75	71				
6000	GW ~ 100 LB	164	160	156	150	145				
	Q - OGE ~ %	90	88	85	81	78				
	Q - IGE ~ %	81	79	77	73	70				
6500	GW ~ 100 LB	161	157	153	147	142				
	Q - OGE ~ %	88	86	84	80	76				
	Q - IGE ~ %	80	78	75	72	68				
7000	GW ~ 100 LB	158	154	150	144	139				
	Q - OGE ~ %	87	84	82	78	74				
	Q - IGE ~ %	78	76	74	70	67				
7500	GW ~ 100 LB	155	151	147	141	136				
	Q - OGE ~ %	85	83	80	76	73				
	Q - IGE ~ %	77	75	72	69	65				
8000	GW ~ 100 LB	152	148	144	138	133				
	Q - OGE ~ %	83	81	78	75	71				
	Q - IGE ~ %	75	73	71	67	64				
8500	GW ~ 100 LB	149	145	141	135	130				
	Q - OGE ~ %	82	79	77	73	69				
	Q - IGE ~ %	73	71	69	66	62				
9000	GW ~ 100 LB	146	142	138	132	127				
	Q - OGE ~ %	80	78	75	71	68				
	Q - IGE ~ %	72	70	68	64	61				
9500	GW ~ 100 LB	143	139	135	130	124				
	Q - OGE ~ %	78	76	73	70	66				
	Q - IGE ~ %	70	68	66	63	59				
10000	GW ~ 100 LB	140	136	132	127	121				
	Q - OGE ~ %	77	74	72	68	64				
	Q - IGE ~ %	69	67	65	61	58				

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF

PRES ALT FT		FREE AIR TEMPERATURE °C								
		-60	-55	-50	-45	-40	-35	-30	-25	-20
10000	GW ~ 100 LB	158	155	154	153	153	153	154	153	153
	Q - OGE ~ %	80	79	79	79	79	80	81	82	82
	Q - IGE ~ %	72	71	71	71	71	72	73	73	74
10500	GW ~ 100 LB	155	152	151	150	150	150	151	150	150
	Q - OGE ~ %	78	77	77	77	78	78	80	80	80
	Q - IGE ~ %	70	70	70	70	70	71	72	72	72
11000	GW ~ 100 LB	152	149	148	148	147	147	148	148	147
	Q - OGE ~ %	77	76	76	76	76	77	78	79	79
	Q - IGE ~ %	69	68	68	68	69	69	70	71	71
11500	GW ~ 100 LB	149	147	145	145	144	145	145	145	144
	Q - OGE ~ %	75	74	74	74	75	76	77	77	77
	Q - IGE ~ %	68	67	67	67	67	68	69	69	70
12000	GW ~ 100 LB	146	144	143	142	142	142	142	142	142
	Q - OGE ~ %	74	73	73	73	73	74	75	76	76
	Q - IGE ~ %	66	66	66	66	66	67	68	68	68
12500	GW ~ 100 LB	143	141	140	139	139	139	139	139	139
	Q - OGE ~ %	72	72	71	72	72	73	74	74	75
	Q - IGE ~ %	65	64	64	65	65	65	66	67	67
13000	GW ~ 100 LB	140	138	137	137	136	136	137	137	136
	Q - OGE ~ %	71	70	70	70	70	71	72	73	73
	Q - IGE ~ %	64	63	63	63	63	64	65	66	66
13500	GW ~ 100 LB	137	136	135	134	133	134	134	134	134
	Q - OGE ~ %	69	69	69	69	69	70	71	71	72
	Q - IGE ~ %	63	62	62	62	62	63	64	64	65
14000	GW ~ 100 LB	135	133	132	131	131	131	131	132	131
	Q - OGE ~ %	68	67	67	68	68	68	69	70	70
	Q - IGE ~ %	61	61	61	61	61	62	62	63	63
14500	GW ~ 100 LB	132	130	129	129	128	128	128	129	128
	Q - OGE ~ %	67	66	66	66	66	67	68	69	69
	Q - IGE ~ %	60	60	60	60	60	60	61	62	62
15000	GW ~ 100 LB	129	128	127	126	125	126	126	127	126
	Q - OGE ~ %	65	65	65	65	65	66	66	67	68
	Q - IGE ~ %	59	58	58	58	58	59	60	61	61

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF

PRES ALT FT		FREE AIR TEMPERATURE °C								
		-20	-15	-10	-5	0	+ 5	+ 10	+ 15	+ 20
10000	GW ~ 100 LB	153	153	153	153	151	148	146	143	140
	Q - OGE ~ %	82	83	83	84	83	82	80	78	77
	Q - IGE ~ %	74	74	75	76	75	73	72	71	69
10500	GW ~ 100 LB	150	150	150	150	147	145	143	140	137
	Q - OGE ~ %	80	81	82	82	81	80	78	77	75
	Q - IGE ~ %	72	73	74	74	73	72	71	69	67
11000	GW ~ 100 LB	147	147	147	147	144	142	140	137	134
	Q - OGE ~ %	79	79	80	80	79	78	77	75	73
	Q - IGE ~ %	71	72	72	72	71	70	69	67	66
11500	GW ~ 100 LB	144	144	144	144	141	139	137	134	131
	Q - OGE ~ %	77	78	79	79	77	76	75	73	72
	Q - IGE ~ %	70	70	71	71	70	69	67	66	64
12000	GW ~ 100 LB	142	141	141	141	138	136	133	131	128
	Q - OGE ~ %	76	76	77	77	76	74	73	71	70
	Q - IGE ~ %	68	69	69	69	68	67	66	64	63
12500	GW ~ 100 LB	139	139	139	138	135	133	131	128	125
	Q - OGE ~ %	75	75	75	75	74	73	71	70	68
	Q - IGE ~ %	67	67	68	68	67	66	64	63	61
13000	GW ~ 100 LB	136	136	136	135	132	130	128	125	122
	Q - OGE ~ %	73	73	74	74	72	71	70	68	66
	Q - IGE ~ %	66	66	67	66	65	64	63	61	60
13500	GW ~ 100 LB	134	133	133	132	129	127	125	122	119
	Q - OGE ~ %	72	72	72	72	71	69	68	67	65
	Q - IGE ~ %	65	65	65	65	64	63	61	60	58
14000	GW ~ 100 LB	131	131	130	129	127	124	122	119	116
	Q - OGE ~ %	70	70	71	70	69	68	67	65	63
	Q - IGE ~ %	63	63	64	63	62	61	60	58	57
14500	GW ~ 100 LB	128	128	128	126	124	122	119	117	114
	Q - OGE ~ %	69	69	70	69	68	66	65	63	62
	Q - IGE ~ %	62	62	63	62	61	60	58	57	55
15000	GW ~ 100 LB	126	125	125	123	121	119	116	114	111
	Q - OGE ~ %	68	68	68	67	66	65	63	62	60
	Q - IGE ~ %	61	61	61	61	59	58	57	56	54

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF)

PRES ALT FT		FREE AIR TEMPERATURE °C								
		∘ 20	∘ 25	∘ 30	∘ 35	∘ 40	∘ 45	∘ 50	∘ 55	∘ 60
10000	GW ~ 100 LB	140	136	132	127	121				
	Q - OGE ~ %	77	74	72	68	64				
	Q - IGE ~ %	69	67	65	61	58				
10500	GW ~ 100 LB	137	133	129	124	118				
	Q - OGE ~ %	75	73	70	66	63				
	Q - IGE ~ %	67	65	63	60	57				
11000	GW ~ 100 LB	134	130	126	121	115				
	Q - OGE ~ %	73	71	68	65	61				
	Q - IGE ~ %	66	64	61	58	55				
11500	GW ~ 100 LB	131	127	123						
	Q - OGE ~ %	72	69	66						
	Q - IGE ~ %	64	62	60						
12000	GW ~ 100 LB	128	124	120						
	Q - OGE ~ %	70	68	65						
	Q - IGE ~ %	63	61	58						
12500	GW ~ 100 LB	125	121	117						
	Q - OGE ~ %	68	66	63						
	Q - IGE ~ %	61	59	57						
13000	GW ~ 100 LB	122	119	114						
	Q - OGE ~ %	66	64	61						
	Q - IGE ~ %	60	58	55						
13500	GW ~ 100 LB	119	116	111						
	Q - OGE ~ %	65	63	60						
	Q - IGE ~ %	58	56	54						
14000	GW ~ 100 LB	116	113	108						
	Q - OGE ~ %	63	61	58						
	Q - IGE ~ %	57	55	52						
14500	GW ~ 100 LB	114	110	106						
	Q - OGE ~ %	62	59	56						
	Q - IGE ~ %	55	54	51						
15000	GW ~ 100 LB	111	108	103						
	Q - OGE ~ %	60	58	55						
	Q - IGE ~ %	54	52	49						

MAXIMUM TORQUE AVAILABLE – 30 MIN LIMIT
ANTI-ICE OFF

PRES ALT FT	FREE AIR TEMPERATURE °C								
	60	-55	-50	-45	-40	-35	-30	-25	-20
0	100	100	100	100	100	100	100	100	100
500	100	100	100	100	100	100	100	100	100
1000	100	100	100	100	100	100	100	100	100
1500	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
2500	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100
3500	100	100	100	100	100	100	100	100	100
4000	99	99	99	99	99	100	100	100	100
4500	97	97	97	97	97	98	100	100	100
5000	95	95	95	95	96	96	98	98	99
5500	93	93	93	93	94	95	96	97	97
6000	92	92	92	92	92	93	94	95	95
6500	90	90	90	90	90	91	93	93	94
7000	89	88	88	88	89	89	91	91	92
7500	87	87	86	87	87	88	89	90	90

MAXIMUM TORQUE AVAILABLE – 30 MIN LIMIT
ANTI-ICE OFF

PRES ALT FT	FREE AIR TEMPERATURE °C								
	-20	-15	-10	-5	0	+ 5	+ 10	+ 15	+ 20
0	100	100	100	100	100	100	100	100	100
500	100	100	100	100	100	100	100	100	100
1000	100	100	100	100	100	100	100	100	100
1500	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
2500	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100
3500	100	100	100	100	100	100	100	100	99
4000	100	100	100	100	100	100	100	99	97
4500	100	100	100	100	100	100	99	98	95
5000	99	100	100	100	100	100	98	96	94
5500	97	98	99	100	100	98	96	94	92
6000	95	96	97	99	98	96	94	92	90
6500	94	94	95	97	96	94	92	91	88
7000	92	93	94	95	94	92	91	89	87
7500	90	91	92	93	92	90	89	87	85

MAXIMUM TORQUE AVAILABLE – 30 MIN LIMIT
ANTI-ICE OFF

PRES ALT FT	FREE AIR TEMPERATURE °C								
	+ 20	+ 25	+ 30	+ 35	+ 40	+ 45	+ 50	+ 55	+ 60
0	100	100	100	100	98	94	89	85	80
500	100	100	100	100	96	92	88	83	79
1000	100	100	100	99	95	90	86	81	77
1500	100	100	100	97	93	88	84	80	75
2000	100	100	99	95	91	87	82	78	74
2500	100	100	98	94	89	85	80	76	72
3000	100	99	96	92	88	83	79	75	71
3500	99	97	94	90	86	81	77	73	69
4000	97	95	92	88	84	80	75	71	67
4500	95	93	90	87	82	78	74	70	66
5000	94	92	89	85	81	77	73	69	65
5500	92	90	87	83	79				
6000	90	88	85	81	78				
6500	88	86	84	80	76				
7000	87	84	82	78	74				
7500	85	83	80	76	73				

MAXIMUM TORQUE AVAILABLE – 30 MIN LIMIT
ANTI-ICE OFF

PRES ALT FT	FREE AIR TEMPERATURE °C								
	-60	-55	-50	-45	-40	-35	-30	-25	-20
7500	87	87	86	87	87	88	89	90	90
8000	86	85	85	85	85	86	88	88	88
8500	84	83	83	83	84	85	86	86	87
9000	83	82	82	82	82	83	84	85	85
9500	81	80	80	80	81	81	83	83	84
10000	80	79	79	79	79	80	81	82	82
10500	78	77	77	77	78	78	80	80	80
11000	77	76	76	76	76	77	78	79	79
11500	75	74	74	74	75	76	77	77	77
12000	74	73	73	73	73	74	75	76	76
12500	72	72	71	72	72	73	74	74	75
13000	71	70	70	70	70	71	72	73	73
13500	69	69	69	69	69	70	71	71	72
14000	68	67	67	68	68	68	69	70	70
14500	67	66	66	66	66	67	68	69	69
15000	65	65	65	65	65	66	66	67	68

MAXIMUM TORQUE AVAILABLE – 30 MIN LIMIT
ANTI-ICE OFF

PRES ALT FT	FREE AIR TEMPERATURE °C								
	-20	-15	-10	-5	0	+ 5	+ 10	+ 15	+ 20
7500	90	91	92	93	92	90	89	87	85
8000	88	89	90	91	90	89	87	85	83
8500	87	88	88	89	88	87	85	84	82
9000	85	86	87	88	86	85	84	82	80
9500	84	84	85	86	85	83	82	80	78
10000	82	83	83	84	83	82	80	78	77
10500	80	81	82	82	81	80	78	77	75
11000	79	79	80	80	79	78	77	75	73
11500	77	78	79	79	77	76	75	73	72
12000	76	76	77	77	76	74	73	71	70
12500	75	75	75	75	74	73	71	70	68
13000	73	73	74	74	72	71	70	68	66
13500	72	72	72	72	71	69	68	67	65
14000	70	70	71	70	69	68	67	65	63
14500	69	69	70	69	68	66	65	63	62
15000	68	68	68	67	66	65	63	62	60

MAXIMUM TORQUE AVAILABLE – 30 MIN LIMIT
ANTI-ICE OFF

PRES ALT FT	FREE AIR TEMPERATURE °C								
	+ 20	+ 25	+ 30	+ 35	+ 40	+ 45	+ 50	+ 55	+ 60
7500	85	83	80	76	73				
8000	83	81	78	75	71				
8500	82	79	77	73	69				
9000	80	78	75	71	68				
9500	78	76	73	70	66				
10000	77	74	72	68	64				
10500	75	73	70	66	63				
11000	73	71	68	65	61				
11500	72	69	66						
12000	70	68	65						
12500	68	66	63						
13000	66	64	61						
13500	65	63	60						
14000	63	61	58						
14500	62	59	56						
15000	60	58	55						

TM 55-1520-238-CL

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, -10 and CL requirements for AH-64A Helicopter, Attack (APACHE).

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = 0.39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = 0.15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = 0.035 ounce
1 dekagram = 10 grams = 0.35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = 0.34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.82 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons